



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/654,603	09/01/2000	David Chazan	100/08510	7110

21569 7590 09/09/2003

CALIPER TECHNOLOGIES CORP
605 FAIRCHILD DRIVE
MOUNTAIN VIEW, CA 94043

EXAMINER

HANDY, DWAYNE K

ART UNIT	PAPER NUMBER
----------	--------------

1743

DATE MAILED: 09/09/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/654,603

Applicant(s)

CHAZAN, DAVID

Examiner

Dwayne K Handy

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-61 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 1-44 and 57-61 is/are allowed.
- 6) ☐ Claim(s) 45-56 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. Claims 1-57 were provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims of copending Application No. 09/394,012. This rejection has been removed in light of the abandonment of that application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 45-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chow (6,167,910). Chow teaches a multilayer microfluidic device system. In general, the system is comprised of multiple stacked layers. Microfabricated elements (grooves, wells, and the like) are manufactured into the surfaces between the various substrate

layers. These microfabricated elements define the various microfluidic aspects or structures of the overall device. In preferred aspects, a separate microscale channel network is provided between each of the substrate layers. The device is best shown in Figures 1A-1C and 4, and described in column 6.

From column 6, lines 34-60: An example of a multi-layer microfluidic device according to the present invention is schematically illustrated in FIG. 1. FIG. 1A illustrates the three-layer construction of the device from a perspective view. FIG. 1B illustrates a perspective view of an assembled device, e.g., where the layers are mated together. FIG. 1C illustrates a side view of the assembled device. As shown, the device 100 includes multiple substrate layers, such as bottom substrate 102, middle substrate 104 and top substrate 106. Bottom substrate 102 includes a top surface 112, which is mated with the bottom surface 114 of the middle substrate 104. The top surface 115 of the middle substrate 104 is likewise mated with the bottom surface 116 of the top substrate 106. A first channel network 122 is fabricated into the top surface 112 of the bottom substrate 102, as a series of grooves. A similar series of grooves is fabricated into the top surface 115 of the middle substrate 104, to form a second channel network 124. Upon mating the top surface of the bottom substrate with the bottom surface of the middle substrate, these grooves form the channels of the device. Alternatively, the channel network 122 is optionally fabricated onto the bottom surface of middle substrate 104. Upon mating with bottom substrate 102, the channels of the device are formed. This alternate method provides for cost savings where materials for the substrate incorporating the channel networks are substantially more costly than those substrates

used as cover layers. Further, alignment of channel networks on different layers of the device is made more simple by their fabrication on a single substrate.” The reference recites the use of laser ablation in fabrication in column 4, lines 15-23: “A variety of substrate materials may be employed as the various layers of the device. Typically, because the devices are microfabricated, substrate materials will be selected based on their compatibility with known microfabrication techniques, e.g. photolithography, wet chemical etching, laser ablation, air abrasion techniques, injection molding, embossing, and other techniques.” Later, Chow discloses the preferred substrate materials in column 4, lines 40-59. The materials include: silica based substrates, such as glass, quartz, silicon or polysilicon, as well as other substrate materials, such as gallium arsenide, as well as polymeric materials, such as plastics, such as polymethylmethacrylate (PMMA), polycarbonate, polytetrafluoroethylene (TEFLON™), polyvinylchloride (PVC), polydimethylsiloxane (PDMS), polysulfone, and the like.

Chow does not specifically recite an embodiment with an “ablatable polymer layer” with a first groove sandwiched between two non-ablatable layers. Chow merely cites the use of polymeric substrates and glass or silica based substrates. It would have been obvious to one of ordinary skill in the art to use an ablatable polymer layer as the material for the middle layer. The use of laser or air ablation would provide a well known microfabrication method (as stated by Chow) for forming the channels or grooves in the middle layer of the microfluidic device. This method would allow for the formation of the grooves in the middle layer without the need for molds (injection moldings) or other chemicals (wet etching). As to the multiple or extra layers recited in

claim 56, it would have been obvious to provide extra layers in the device in order to provide extra channels for storage or sample manipulation. The use of ablatable material in the second layer would also be to allow the use of a well known microfabrication technique – again air or laser ablation - when forming the grooves in the second layer.

Response to Arguments

5. Applicant's arguments, filed 7/1/03, with respect to the rejection(s) of claim(s) 45-55 under U.S.C. 102(e) using the reference "Chow" have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of "Chow" under U.S.C. 103. This rejection was given above.

Allowable Subject Matter

6. Claims 1-44 and 57-61 allowed.

7. The following is a statement of reasons for the indication of allowable subject matter. In claim 1 applicant has claimed a method of manufacturing a microfabricated channel network comprised of the steps of: providing a first planar substrate; depositing a first polymer layer on the first surface of the substrate; removing a first portion of the polymer layer to provide one or more grooves in the polymer layer; and overlaying a second planar substrate to seal the one or more grooves in the polymer layer. In claim 25 applicant has claimed a microfluidic device comprised of a first substrate polymer

layer; a first photoimagable polymer layer on the first surface of the first substrate having at least a first groove disposed therein; and a second planar substrate layer having a first surface mated with and overlaying the photoimagable polymer layer. Claim 57 also includes this device as well as other features including a material transport system and detector apparatus.

The Examiner considers the previously cited references "Quake" and "Moles" to be the closest prior art. Quake teaches a method of making a microfluidic device which involves the depositing of a photoimagable polymer layer which is later removed as part of the manufacturing process. Moles teaches an analyzing module comprised of polyimide layers bound to a single rigid substrate.

\

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwayne K Handy whose telephone number is (703)-305-0211. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (703)-308-4037. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 1743

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0661.

Dkh
September 7, 2003


Jill Warder,
Supervisory Patent Examiner
Technology Center 1700